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EXAMINER

SHEW, JOHN

ART UNIT PAPER NUMBER

2664

DATE MAILED: 11/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/820,521	Applicant(s) CHIDAMBARAN ET AL.	
	Examiner John L Shew	Art Unit 2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-30 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 10, 12-20, 22, 23, 25 and 26 is/are rejected.
- 7) ☒ Claim(s) 8, 11, 21 and 24 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08/27/01 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

FIG. 1 is missing reference numeral "20" identifying the second HSS Service Shelf on the right.

FIG. 4 is missing reference numeral "68" identifying "VOQ MEMORY INTERFACE (VMI0)"

2. The drawings are objected to because :

FIG. 4 reference numeral "54" identifies block citing "EGRESS TRANSMIT LOGIC (ITL0)" should be "INGRESS TRANSMIT LOGIC (ITL0)". Corresponding correction applies to block ITL1.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be

Art Unit: 2664

canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

Page 4 line 23 cites "service cards 12" should be "service cards 24".

Page 5 line 2 cites "shelves 12, 13" should be "shelves 12, 20".

Page 5 line 4 cites "shelf 12, 13" should be "shelf 12, 20".

Page 5 line 7 cites "shelves 12, 13" should be "shelves 12, 20".

Appropriate correction is required.

Claim Objections

4. Claim 13 recites the limitation "said flow controllers" in Claim 13. There is insufficient antecedent basis for this limitation in the claim. The claim being dependent on itself has not defined any prior limitations.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 6, 7, 10, 12, 13, 14, 15, 19, 20, 23, 25, 26 are rejected under 35

U.S.C. 103(a) as being unpatentable over Simons et al. in view of Grenier.

Claim 1, Simons teaches a method of performing a switchover of data flows in a multiservice packet based switch (column 2 lines 50-67, column 3 lines 1-8, column 8 lines 14-25) referenced by a network switch with 1+1 redundancy scheme, form a first data flow to a second redundant data flow without loss of data (column 1 lines 28-57)

referenced by 1+1 redundancy design through the switch for hot backup running of hardware and software simultaneously, said multiservice switch including redundant switching cores (FIG. 35A) referenced by Switching Fabric Cards 570a and 570b, said method comprising the steps of providing a plurality of ingress and egress communications traffic flow controllers (FIG. 35A, FIG. 35B, column 45 lines 34-67) referenced by the XC cards 562a and 566a which contains a plurality of Forwarding Cards for ingress 546 and egress 550, each of said flow controllers directing one or more threads of said communications traffic over one or another of said redundant switching cores (column 45 lines 56-67, column 46 lines 1-13) referenced by 1:1 redundant cross-connection cards 562a and 562b with hardware and software backup, monitoring communications flow paths traversing said ingress flow controller one of said redundant switching cores and said egress flow controller (FIG. 26, column 19 lines 24-31, column 33 lines 59-67, column 34 lines 1-28) referenced by the Local Resiliency Manager process resident on the network switch which monitors for fault events, indicating to said egress flow controller an intention to switch at least a portion of said data flows to a path including said another switching core (column 34 lines 56-67, column 35 lines 58-67, column 36 lines 1-2) referenced by the Service Specific Connection Oriented Protocol 439 detection of a fault resulting in notification to the LRM for error resolution including the fail over of one or more boards to backup redundant boards. Simons does not teach waiting a given time to cease receipt of packets from one switching core before receiving an indication to start accepting data from another core.

Art Unit: 2664

Grenier teaches waiting a given time to cease receipt of packets from said one switching core (FIG. 7B) referenced by the selector node 100H waiting and receiving the in-transit packets from the intermediate node 100E, receiving an indication to start accepting said data flow from a path traversing said another core, (FIG. 11) referenced by step 1116 receiving request for protection path, receiving said data flow from said path traversing said another core (FIG. 11) referenced by step 1118 begin sending traffic on protection path.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 2, Simons does not teach virtual output queues.

Grenier teaches one or more virtual output queues (VOQ) exist (FIG. 2, column 3 lines 11-32) referenced by the ATM virtual channel connections, for a particular ingress flow controller and a particular egress flow controller (FIG. 2) from ingress bridge node 100C to egress bridge node 100H, switching from said first data flow to said second redundant data flow being accomplished on a per VOQ basis (FIG. 7B) referenced by the switch from traffic flow 242 to redundant traffic flow 262.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 6, Simons teaches wherein the step of accepting includes the step of altering a filter table in said egress flow controller upon detection of said indication to start accepting said data flow from said another switching core (column 32 lines 33-56) referenced by the update of the driver connection table to synchronize with the ATM connection table of active connections when a failure occurs.

Claim 7, Simons does not teach special test cells with a destination address.

Grenier teaches a destination address of a special test cell is directed to a specific flow controller with regard to a unicast switchover (FIG. 11, column 11 lines 65-67) referenced by step 1116 receive request for protection path which is incorporated within an ATM cell carrying the destination address of bridge node 100C subsequently followed by steps 1118 and 1120 for the protection switchover wherein the bridge node equates to the flow controller forwarding cards of Simons.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of

Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 10, Simons does not teach backpressure is asserted to an ingress flow controller. Grenier teaches VOQ backpressure is asserted to an ingress flow controller once a valid switchover communication is received regarding a corresponding VOQ thereby enabling FIFOs in said ingress flow controllers to drain (FIG. 11, FIG. 12A-12I) referenced by the Request For Protection Path signal to the ingress node 100C for a switchover followed by reception of AIS signal on the traffic channel 832 of node 100B to drain the data on traffic channel 832 before ingress node 100C forwards data over protection traffic channel 862.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 12, Simons teaches said flow controllers further include a function for aggregation of various data flows (FIG 35A, FIG. 36B, column 46 lines 30-54, column 47 lines 14-31) referenced by the Forwarding Card function 546 which aggregates ATM cell stream data based on the quadrant to which data is switched.

Claim 13, Simons teaches said flow controllers further include an arbiter function for selection of said data flows (FIG. 35A, FIG. 36A, column 46 lines 55-67, column 47 lines 1-13, column 51 lines 34-63) referenced by the Cross Connect Card 562 which arbitrates the data from Universal Port Cards 554a-554g through policy based provisioning information with a Cross-Connect Manager.

Claim 14, Simons teaches a multiservice packet based switch apparatus capable of performing a switchover of data flows (column 2 lines 50-67, column 3 lines 1-8, column 8 lines 14-25) referenced by a network switch with 1+1 redundancy scheme, from a first data flow to a second redundant data flow without data loss (column 1 lines 28-57) referenced by 1+1 redundancy design through the switch for hot backup running of hardware and software simultaneously, said apparatus comprising at least two redundant switching cores (FIG. 35A) referenced by Switching Fabric Cards 570a and 570b, and a plurality of ingress and egress communications traffic flow controllers coupled to said switching cores (FIG. 35A, FIG. 35B, column 45 lines 34-67) referenced by the XC cards 562a and 566a which contains a plurality of Forwarding Cards for ingress 546 and egress 550, each of said flow controllers directing one or more threads of said communications traffic over one or another of said redundant switching cores (column 45 lines 56-67, column 46 lines 1-13) referenced by 1:1 redundant cross-connection cards 562a and 562b with hardware and software backup, respective ones of said flow controllers monitoring corresponding communications flow paths traversing said ingress flow controller one of said redundant switching cores and said egress flow

controller (FIG. 26, column 19 lines 24-31, column 33 lines 59-67, column 34 lines 1-28) referenced by the Local Resiliency Manager process resident on the network switch which monitors for fault events. Simons does not teach receiving a request for a data flow switchover nor an egress flow controller waiting a given time to cease receipt of packets from on switching core.

Grenier teaches a test cell generator included in said flow controllers operable to receive a request for a data flow switchover (FIG. 11, FIG. 12F) referenced by node 100C as a test cell generator in establishing the APS channel and as a flow controller receiving a Request For Protection Path, and in response thereto to indicate to said egress flow controller an intention to switch at least a portion of said data flows to a path including said another switching core (FIG. 11, FIG. 12I) referenced by step 1118 Begin Sending Traffic On Protection Path, said egress flow controller waiting a given time to cease receipt of packets from said one switching core (FIG. 7B) referenced by the selector node 100H waiting and receiving the in-transit packets from the intermediate node 100E, wherein an indication is received to start accepting said data flow (FIG. 11) referenced by step 1116 receiving request for protection path, from a path traversing said another core and said data flows from said path traversing said another core are accepted thereafter (FIG. 11, FIG. 12I) referenced by step 1118 begin sending traffic on protection path.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of

Art Unit: 2664

Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 15, Simons does not teach virtual output queues.

Grenier teaches one or more virtual output queues (VOQ) exist (FIG. 2, column 3 lines 11-32) referenced by the ATM virtual channel connections, for a particular egress flow controller (FIG. 2) from ingress bridge node 100C to egress bridge node 100H, switching from said first data flow to said second redundant data flow being accomplished on a per VOQ basis (FIG. 7B) referenced by the switch from traffic flow channel 242 to redundant traffic flow channel 262.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 19, Simons teaches wherein said egress flow controller includes a filter table which is altered upon detection of said indication to start accepting said data flow from said another switching core (column 32 lines 33-56) referenced by the update of the driver connection table to synchronize with the ATM connection table of active connections when a failure occurs.

Claim 20, Simons does not teach special test cells with a destination address.

Grenier teaches wherein a destination address of a special test cell is directed to a specific flow controller with regard to a unicast switchover (FIG. 11, column 11 lines 65-67) referenced by step 1116 receive request for protection path which is incorporated within an ATM cell carrying the destination address of bridge node 100C subsequently followed by steps 1118 and 1120 for the protection switchover wherein the bridge node equates to the flow controller forwarding cards of Simons.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 23, Simons does not teach backpressure is asserted to an ingress flow controller. Grenier teaches VOQ backpressure is asserted to an ingress flow controller once a valid switchover communication is received regarding a corresponding VOQ thereby enabling FIFOs in said ingress flow controllers to drain (FIG. 11, FIG. 12A-12I) referenced by the Request For Protection Path signal to the ingress node 100C for a switchover followed by reception of AIS signal on the traffic channel 832 of node 100B to drain the data on traffic channel 832 before ingress node 100C forwards data over protection traffic channel 862.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection

scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 25, Simons teaches said flow controllers further include a function for aggregation of various data flows (FIG 35A, FIG. 36B, column 46 lines 30-54, column 47 lines 14-31) referenced by the Forwarding Card function 546 which aggregates ATM cell stream data based on the quadrant to which data is switched.

Claim 26, Simons teaches said flow controllers further include an arbiter function for selection of said data flows (FIG. 35A, FIG. 36A, column 46 lines 55-67, column 47 lines 1-13, column 51 lines 34-63) referenced by the Cross Connect Card 562 which arbitrates the data from Universal Port Cards 554a-554g through policy based provisioning information with a Cross-Connect Manager.

6. Claims 3, 4, 5, 9, 16, 17, 18, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simons and Grenier as applied to claims 1, 2, 6, 7, 10, 12, 13, 14, 15, 19, 20, 23, 25, 26 above, and further in view of Law et al.

Claim 3, Simons and Grenier teaches a network device supporting redundancy schemes for protecting virtual traffic. They do not teach the step on monitoring data flows is through link test cells.

Law teaches the step of monitoring data flows is accomplished using link test cells (FIG. 5) referenced by the count toggle signal, generated from a link test generator in said ingress flow controller to a link test cell receiver in said egress flow controller (FIG. 6) referenced by the ingress Toggle Setter 64 which generates the count toggle signal to a egress Toggle Detector 72 to receive the count toggle signal within the ATM switch 20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the count toggle signal of Law to the redundancy scheme for protecting virtual traffic of Simons and Grenier for the purpose of detecting cell loss.

Claims 4, 5, Simons does not teach an end-of-flow test cell nor start of flow test cell. Grenier teaches an indication to switch said data flow path is given by an end-of-flow (EOF) test cell (FIG. 11) reference by step 1106 of send AIS cell on Automatic Protection Switching channel which is an alarm indication signal to stop the traffic flow on the traffic channel.

Grenier teaches an indication to start accepting packets from said another core is given by a start-of-flow (SOF) test cell (FIG. 11) reference by step 1116 receive request for protection path followed by step 1117 begin sending traffic on protection path.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection

scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 9, Simons does not teach scheduling of SOF until EOF is dequeued.

Grenier teaches a SOF test cell for flow controller corresponding to an offline data flow is not scheduled until an EOF test cell has been dequeued from the flow controller corresponding to the online data flow (FIG. 11) referenced by step 1110 receive AIS cell on the APS channel equating to the EOF followed by step 1114 receive AIS cells on traffic channels which clears all remaining traffic cells and equates to dequeuing of the EOF subsequently followed by step 1116 receive request for protection path equating to the SOF test cell.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 16, Simons and Grenier teaches a network device supporting redundancy schemes for protecting virtual traffic. They do not teach monitoring data flows through link test cells.

Law teaches wherein monitoring of data flows is accomplished using link test cells (FIG. 5) referenced by the count toggle signal, generated from a link test generator in said ingress flow controller to a link test cell receiver in said egress flow controller (FIG. 6) referenced by the ingress Toggle Setter 64 which generates the count toggle signal to a egress Toggle Detector 72 to receive the count toggle signal within the ATM switch 20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the count toggle signal of Law to the redundancy scheme for protecting virtual traffic of Simons and Grenier for the purpose of detecting cell loss.

Claims 17, 18, Simons does not teach an end-of-flow test cell nor start of flow test cell. Grenier teaches wherein said indication to switch said data flow path is given by an end-of-flow (EOF) test cell (FIG. 11) reference by step 1106 of send AIS cell on Automatic Protection Switching channel which is an alarm indication signal to stop the traffic flow on the traffic channel.

Grenier teaches wherein said indication to start accepting packets from said another core is given by a start-of-flow (SOF) test cell (FIG. 11) reference by step 1116 receive request for protection path followed by step 1117 begin sending traffic on protection path.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of

Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Claim 22, Simons does not teach scheduling of SOF until EOF is dequeued.

Grenier teaches wherein a SOF test cell for flow controller corresponding to an offline data flow is not scheduled until an EOF test cell has been dequeued from the flow controller corresponding to the online data flow (FIG. 11) referenced by step 1110 receive AIS cell on the APS channel equating to the EOF followed by step 1114 receive AIS cells on traffic channels which clears all remaining traffic cells and equates to dequeuing of the EOF subsequently followed by step 1116 receive request for protection path equating to the SOF test cell.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system for protecting virtual traffic using 1+1 protection scheme with the 1:1 protection scheme of Grenier to the multiple redundancy scheme of Simons for the purpose of preventing premature termination of an end-to-end traffic connection.

Allowable Subject Matter

7. Claims 8, 11, 21, 24, 27-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 27-30 are allowed. The prior art search did not disclose a packet switch performing switchover of redundant paths with the stoppage of both queues via an end-of-flow message. The purpose of redundant paths is to provide a fast method of switchover to avoid data loss to the far end point. Generally to achieve the limitation of data flow without loss of data, data flow is not stopped on the redundant path but merely switched over at the appropriate time. This limitation is unique in that time critical data is halted at the queues for a short duration.

Citation of Prior Art

Art Unit: 2664

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patent 5130984, Cisneros discloses a fault tolerant ATM packet switch. Patent 5802050, Petersen et al. discloses a minicell sequence number count for detecting data cell loss. Patent 6795393, Mazzurco et al. discloses a method for errorless path protection and rearrangement. Patent 6590870, Mellberg discloses transmission of alternating delimiter code to achieve bit alignment when using in-band digital code sequences. Patent 4710916, Amstutz et al. discloses a switching apparatus for burst-switching communications system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John L Shew whose telephone number is 571-272-3137. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on 571-272-3134. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2664

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

js

A handwritten signature in black ink, appearing to be 'W. Kelly', with a long horizontal line extending to the right.